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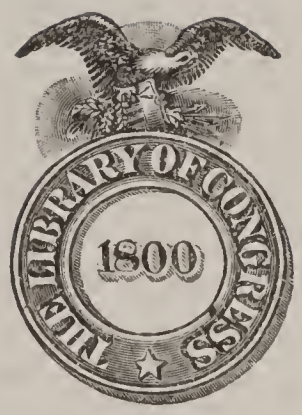

The Strength That Is Stored In Starch

A Great Food Producer of Human Heat and Energy Which Nature Generously Provides

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IF nature were a shopkeeper whose counters teemed with just such a tempting array of things as we, when young, found in the candy store, and if we who must eat to live were standing like children, trying to decide what to buy, she might smile at us and say:

"Well, my dears, if you want to spend your money wisely you'll take a mixture. You'll put a penny in fats for warmth, and another in protein which makes muscle; you'll want carbohydrates to supply heat and energy and mineral salts and vitamines for regulation."

"But what carbohydrate is best to buy?" you might ask. And nature, proud of her stock, probably would say, "Starch, my child, starch!

"That's why I put some of it in every plant food I offer to man—because it's so good for the body. That's why I've made it easy to get and cheap."

Such a dialogue might well take place between nature and man, though the average person seldom stops to think about the high part played by starch in the sustenance of the race.

A Fundamental Food

To begin with, the very cornerstone of our daily food—the loaf of bread, which plays a leading part in every meal in every home from hut to White House—is a starch food. All cereal grains are starch foods, and this most widely diffused of basic food substances not only abides in the seed of plants as in cereals, but also in the roots, as in cassava; the tuber, as in the potato; the fruits, as in the banana; the stem, as in celery, rhubarb and sago, and the leaves, as in spinach.

Turn where we may, among plants and vegetable foods, and we find starch—á really remarkable combination of three of the elements which make human life possible—a mixture of six parts carbon, ten parts hydrogen and five parts oxygen.

It represents nature's most wonderful system for the storage of nutrition—the storage of food first for the seed of the plant to feed upon until the new growth is capable of supplying itself; then for the plant itself, and finally for man.

In the daily diet it has played a major rôle ever since the first human being sat down—or stood, as the case may have been—to eat his first meal. Whatever may have been excluded from that prehistoric menu, we may be sure starch formed some part of it. Whatever has been lacking in the countless quadrillions of menus since employed in the feeding of the race, it is safe to assume that starch in some form has been served more times than any other one food-

stuff—in fact to-day it forms more than two-thirds of the daily human diet.

Our Friend in Armor

THIS king of carbohydrates, which supplies so large a share of the food-fuel to heat the human house and create sufficient energy to run the human machinery, comes in a curious package—a granule so small as to be indistinguishable to the naked eye. These granules are distributed more or less profusely throughout the vegetable kingdom, and when separated from their surroundings, present the appearance of a glistening white powder.

Under a powerful microscope this powder is revealed as a heap of variously formed round or oval shapes, which differ in size according to their source. Each is a waterproof package, the outer covering of which is tough and firm, while the inner contents consist of an infinite number of atoms.

Now nature thus protects this element for a most excellent reason—nature does nothing without good cause. Starch is her chief food provision for the perpetuation of the vegetable kingdom, so she makes sure of a dependable supply by so weather-proofing the package as to prevent rain from washing it away!

Nature's primary idea in starch production is to supply the most perfect chain-system of storage warehouses for food ever devised; a system which makes man's most successful attempt in this line look like the proverbial thirty cents. When man came along he found this system awaiting his need,

and he has appropriated it to such an extent that today more starch is consumed than any other single food element.

It is the easiest of all to get, for it is found in every member of the big vegetable family. This fact, of course, makes it the cheapest. But there is something else about starch—a virtue less known than it should be—which justifies the great shopkeeper in so highly recommending it.

Starch Cleanses the Digestive Tract

NEARLY everything we eat has possibilities for harming the human body. The best of food cannot produce satisfactory results unless properly masticated. The most desirable body fuel will hinder rather than help, if eaten in too large quantity; in wrong combinations, or at unsuitable hours. Besides all this, some foods have a greater tendency than others to misbehave in the stomach or intestines, and it is one of the wonderful things about food chemistry that there are other foods which offset these mischief makers.

As is well known, continued low heat causes the protein foodstuffs to putrefy, and in this process of putrefaction are produced some of the deadliest poisons known to science.

But the only change wrought in starch by continued low heat such as surrounds all food matter in the stomach and intestines, is fermentation—and whatever damage may be caused by certain liquids swallowed after fermentation has given them power

to intoxicate, such fermentation as starch undergoes in the intestinal tract adds largely to its value by giving it power to cleanse and disinfect the alimentary canal.

Starch itself is not a disinfectant, but when the granules ferment they produce an acid which is one of the most effective, harmless disinfectants known in nature.

Hostile Inhabitants

When you stop to consider that the intestines are inhabited by more than one hundred and fifty different kinds of germs, each capable of producing its own peculiar poison, and that these germs are more of a menace dead than alive, you begin to see what it means to have a food like starch, which not only supplies fuel for heat and energy, but also contributes a real safety-first element to the diet.

And when you go a step further and learn that of the three hundred trillion germs produced daily in the body, more than ninety per cent die daily and thus become a hindrance to health, you appreciate more fully the value of a palatable, hearty food which, in addition to its nutritive power, serves also as an effective antidote for the poisons thus generated.

That is why we may call starch the most harmless of foods, and why a large inclusion of starch in the daily diet—especially as supplied by starchy vegetables—will go a long way toward keeping us sanitary as well as strong.

The Importance of Starch Digestion

THE very protection nature has put around these packages of starch to keep moisture from destroying this great store of food for plant, animal and man, is one of the main advantages to the last-named member of this trinity. For if man were not compelled to break through this wall, the starch granules would be of small use to him as nutrition and would actually create a disturbance in his department of the interior.

When subjected to moist heat at high temperature, the starch in these granules swells until it ruptures the waterproof husk, and after being thus cooked in water, forms a white "colloid," or sort of paste. It is this substance which proves easy of attack by the digestive juices.

Ordinary cooking or boiling thus "converts" the starch, and as soon as this paste comes in contact with the saliva in the mouth, there takes place the first stage in the transformation of starch into fruit sugar—a process which includes some thirty different stages before the full food value of the starch has become available to the body.

The saliva cannot act upon raw starch, and while the digestive juices in the stomach are capable of conquering it to a certain degree, after a hard fight, the burden thus placed upon them is too heavy and should be avoided wherever possible. And wherever possible, we should so prepare our food as to facili-

tate "mouth digestion"—the first step in the long process.

Nature's reason for converting starch into sugar in the body is to provide a circulating rather than a stored-up source of heat and energy. Sugar, which with starch shares the throne of power in the carbohydrate kingdom, is the "circulating" carbohydrate —the soluble form of this necessary food element. Starch forms the vast reserve supply of carbohydrate, and all the starch in the foods we eat must be converted into sugar and dextrin before it can circulate through our bodies to become available as energy.

The Cause of "Starch Indigestion"

JUST here let me remind the woman who makes the menu to be careful to avoid crowding too many starch-foods into one meal.

Excess consumption of any one food element is bound to lead to discomfort, if not disaster. In order to maintain the body at the highest degree of physical efficiency it is necessary to properly combine the various elements. When we eat too much starch—when we make a meal, for instance, chiefly of bread, potatoes, rice and tapioca pudding—we are bound to suffer some sort of penalty.

Now, it is a fact that many persons overeat of starch. Often they get as much as they need in bread alone, yet the snowy loaf is so tempting and there are so many other good starch foods, that

while the spirit may be willing, the flesh is weak. What is the result?

We call it "starch indigestion," but that is largely a misnomer. The starch is digested, but more than is needed is digested and assimilated. Too much of this form of energy material is delivered to the human system. And as you know, too much often is as hard to contend with as not enough.

There is a real form of starch indigestion caused by undercooking of bread and cereals. Hence all bread should be thoroughly baked, and toast and zwieback frequently served. But no one should get the wrong idea that starch is a food to be avoided. On the contrary, it is a food to be courted, and nature emphasizes this at every turn.

The Prize Quartet

In the great chain system of starch storehouses she has provided, we find four chief starch food structures—the cassava, from which tapioca comes; the potato, and wheat and rice. As I have said before, some measure of starch is found in every vegetable growth, those that mature above ground as well as those that fruit below. But in these four foodstuffs nature has concentrated her supply of this great heat and energy-maker.

Other cereal grains such as corn, barley, rye, oats and buckwheat contain almost as much starch as wheat, but the last-named is endowed with certain advantages which make it preferable as a breadstuff. Other tubers, such as the sweet potato, yam

and dasheen, are almost as rich in starch as the white potato, but here again nature has equipped this particular vegetable with notable advantages. Certain fruits, headed by the banana, are worthy of mention as starch providers. But the price quartet consists of tapioca, the potato, wheat and rice.

His Highness, Prince Potato

THE great starch food of the north is the potato, a vegetable so familiar to so many millions of people as to need neither praise nor description. It is the starch standby of the north temperate zone, and since its introduction to Europe by Sir Walter Raleigh in 1586—although it did not come into general use there until about the middle of the eighteenth century—it has become, next to bread itself, a nutritive standard for nearly half the world.

So long as there remains the possibility of growing a potato crop, the human family stands in no danger of general famine. And when we stop to consider that our vast present-day potato production is only a sign of what could be done in this line if intensive methods of cultivation were everywhere employed, we can see what limitless food possibilities exist in this field alone.

Bread and potatoes are as much a part of life in America and most European countries as air and water. But when it comes to the other members of this quartet—tapioca and rice—Americans and Europeans still have much to learn.

Where Cassava is Bread

IT may surprise many a reader to know there are hundreds of millions of world dwellers who do not eat bread, as we Americans know it. This fact is not to be taken as indication of savagery, for these multitudes get from other foodstuffs that which we get from bread.

Chief among such is the cassava plant, which in the tropics rivals the sweet potato and the yam, and from which is produced the dried starch product called tapioca, largely used, but not largely enough, in lands where bread and potatoes abound.

The cassava is a plant that grows to a height of eight or ten feet and develops long, thick roots in which is stored its starch. It flourishes throughout the tropics and is cultivated for food purposes chiefly in the northern part of South America, the West Indies, West Africa, the East Indian Islands and the Malay Peninsula, in all of which lands cassava cakes and boiled or baked cassava roots are as common to the daily diet as bread and potatoes in our own country.

Surprising as it may seem to us, this plant really is more important to humanity, so far as starch supply is concerned, than the potato, or the wheat grain, for more millions depend solely on it for such nourishment.

Tapioca is Pure Starch

TAPIOCA is made by heating the starch obtained from the roots of the cassava plant, and in company

with arrowroot, corn-starch and sago, it ranks highest in its percentage of starch content.

It is virtually pure starch and as such, of course, provides a highly concentrated form of heat and energy food. When cooked it becomes a translucent and most nutritious jelly, an excellent material for puddings and also valuable for the thickening of soups. The fact that it is reasonable in price and easily prepared for the table, and that it supplies a most necessary food element in almost pure form should largely increase its daily use in the homes of this country.

Many Reasons for Rice

In the case of rice—a leader among starch foods, and one which forms the principal article of diet for more than half the people in the world—we come to a year-round staple which, because of the many ways it can be cooked, served and combined, more than matches macaroni as a "summer meat."

Like tapioca, rice ranks high among the starch foods which contain the lowest percentage of fat—and this is a matter of real importance, especially when considering hot weather foodstuffs. The starch foods which contain the least fat are the most easily digested and, of course, the least apt to putrefy in the intestines.

Naturally there is more danger from putrefaction in hot weather than in cold weather—this is one of the reasons for widespread prevalence of intestinal troubles during the summer season.

There are many dietitians who hold that a menu consisting largely of starch foods, fresh fruits and green vegetables is the ideal form of hot weather health-insurance.

At the head of the virtues of rice stands this—that it is one of the most digestible of all foods. Boiled rice is digested in about half an hour, while white bread takes three times as long to pass through the processes which release its valuable properties to body use.

Rice is a most nutritious food, although in many instances we Americans make the mistake of serving it as a sort of side dish. Its power of sustenance is proved by the strength and endurance of the Chinese coolies, Turkish porters and Japanese laborers, for whom it is the chief, almost sole, article of diet, and who do the hardest kind of work with a minimum of fatigue.

Since it contains almost no cellulose or roughage and, as commonly used in the polished form, is deficient in vitamines and mineral salts, its serving should always be accompanied by milk and other foods which provide these vital elements, and supply a sufficiency of roughage to facilitate the functions of the intestinal tract.

Within the past few years much has been said about the danger of eating polished rice, and the fact that beri-beri, a serious nutritional disease widely prevalent in the Far East, is caused by excess consumption of polished rice and can be cured by eating the whole or unpolished grain, has brought

about a good deal of discussion on the various types of rice, and resulted in some confusion.

In the course of this discussion, polished, unpolished, white, brown and whole rice have been so mixed in the public mind as to necessitate a setting in order.

To begin with, all natural rice varies in shade, from white to pinkish white, and differing depths of brown, depending on the variety or the nature of the soil in which it is grown. These variations in color have nothing to do with food value, however.

Some rice is whitened with talcum, to make it more attractive in appearance, and most rice is polished in order to insure its keeping qualities. This polishing process removes the outer covering of bran, which supplies the roughage, and the middle (aleurone) layer in which are stored the vital elements. So brown rice is not unpolished rice, but merely rice that has not been treated with talcum. Yet some manufacturers, willing to profit from false pretences, have been advertising brown rice as superior in food value to the white. Upon this point, E. V. McCollum of Johns Hopkins University, a leading food scientist, speaks as follows:

"There is no reason whatever for whitening rice because it keeps just as well without it, but since it is customary to wash the grains before cooking, there is no reason for condemning it. Brown rice has no superiority over white rice, and both have the same dietary properties, and are inferior to the unpolished. The latter is not a complete food in itself. The rational policy is to continue the use of polished rice, since there are good reasons why, when it is to enter

commerce, with an uncertainty as to when it will be consumed, it should have the highest possible keeping qualities."

We Should Eat More Rice

We do not make large enough use of rice. Pound for pound, it equals the potato as a fuel-food and in the whole grain or unpolished form is rich in vitamines. In our American homes it should be more frequently employed as a potato substitute, especially in the late winter and early spring, when old potatoes are sprouting and new potatoes are too high in price for the average pocket-book.

As a non-fat-bearing starch food, the pre-eminence of rice is evidenced by the fact that it contains only .3 of 1 per cent of fat, while hominy contains 8.4 per cent, oatmeal 7.2 per cent, and cornmeal 1.9 per cent. So those who need or desire a diet which will supply plenty of heat and energy fuel without burdening the body machinery with an excess of fat will find rice a true and faithful friend. As before stated, it must not be depended upon as anything like a complete food in itself. A person could not maintain health for any great length of time on a diet consisting solely of rice, but where fruit and fresh vegetables are added, with an occasional modest fat ration, it is quite within the realm of possibility to maintain health and strength for an indefinite period.

It would be unfair to conclude this article without special mention of corn, which is one of the most important among starch foods, and which also con-

tains a larger percentage of protein than the foodstuffs here dealt with. As a food there is none which outranks corn for all-round purposes, and the starch it supplies forms one of the indispensables in the American home, corn-starch being one of the most popular and widely used of all forms of starch in this country. Of late years the food value of corn has become more patent to Europeans, the war having taught them many new things concerning its worth.

In every home, everywhere, starch is indispensable. Its place in the diet is as well fixed as that of the sun in the sky. Its purpose is provision of heat and energy fuel with the smallest probability of overstrain on the delicate machinery of the digestive tract. We may accept it as evidence of the fact that nature desires man to have one foodstuff which, because of its wide and plentiful distribution, should serve as a sort of perpetual defense against starvation.

RECIPES

Fruit Tapioca Soup

Wash three cupfuls of red raspberries and one cupful of red currants. Mash, add one cupful of sugar and let stand one hour. Rub through a fine strainer and heat slowly to the boiling point. Add one cupful of boiling water and one-quarter cupful of tapioca. Cook until clear, remove from the fire and cool. Serve in bouillon cups or glasses with shaved ice. Two tablespoonfuls of corn-starch or one and one-half tablespoonfuls of arrowroot may be used instead of tapioca if desired. Cook in double boiler until transparent.

Corn-starch and Apple Croquettes

Peel, core and chop tart apples to make two cupfuls. Put in a saucepan with one tablespoonful each of butter and water and cook slowly until soft. Rub through a fine strainer and cook again in a double boiler until the pulp is very thick. Mix one-third cupful of corn-starch with one-half cupful of cold water and one-eighth teaspoonful of salt. Stir into the apple pulp and cook for fifteen minutes. Beat in one egg and remove from the fire. Pour into a platter rinsed with cold water and set aside to cool. When cold and firm take up a small spoonful of the mixture, roll in fine dry bread crumbs, then in beaten egg and again in crumbs. Drop into deep fat heated to 390 degrees and fry a golden brown. Drain and serve with poultry. One-fourth teaspoonful of cinnamon or one-half teaspoonful of grated lemon peel may be added to the apple pulp if a more highly seasoned product is desired. The croquettes may be served with lemon sauce for dessert.

Cream Pie

Scald three cupfuls of rich milk. Mix six tablespoonfuls of corn-starch with one-half cupful of sugar and three well beaten eggs. Add the scalded milk slowly, stirring constantly. Return to the saucepan and cook, stirring constantly until the mixture thickens. Continue cooking for ten minutes, stirring occasionally. Remove from the fire, stir in two teaspoonfuls of vanilla extract and one-half cupful of whipped cream. Cool and pour into a baked pie shell. Chill and serve with whipped cream spread over the top. The cream may be omitted and the pie sprinkled with powdered sugar or covered with a meringue.

Farina Custard

Scald one quart of milk and stir in slowly one-half cupful of farina, one-half teaspoonful of salt and one-third cupful of sugar.

Cook, stirring constantly, for five minutes, then cook in a double boiler for thirty minutes. Remove from the fire, and pour slowly into three well beaten eggs. Add two tablespoonfuls of butter and pour the mixture into buttered individual custard cups. Place the cups in a pan of hot water and bake in a slow oven for thirty minutes or until firm. Serve cold, either plain or with any fresh fruit.

Peaches and Rice

Wash one cupful of rice and cook for ten minutes in one and one-half cupful of boiling water. Add one teaspoonful of salt, one-half cupful of sugar and one quart of scalded milk and cook in a double boiler until the rice is tender and the milk absorbed. Stir two cupfuls of fresh sliced peaches carefully into the rice, cover and cook ten minutes. Serve hot or cold with milk or cream. This is an excellent luncheon dish for warm weather when served with plenty of milk and graham bread and butter.

Arrowroot Blanc Mange

Scald one quart of milk. Mix one-half cupful of sugar with five tablespoonfuls of arrowroot and one-eighth teaspoonful of salt. Add two beaten eggs and beat until smooth. Then stir in the scalded milk. Cook, stirring constantly until thickened and smooth. Continue cooking for ten to fifteen minutes. Pour into a mold rinsed with cold water and set aside to cool. Serve cold with whipped cream, or a fruit sauce.

Arrowroot Jelly

Heat two cupfuls raspberry, strawberry or any fruit juice to the boiling point with one cupful of boiling water and enough sugar to sweeten. Mix four tablespoonfuls of arrowroot with a little cold water and stir into the hot fruit juice. Stir until thickened, then continue cooking for twenty minutes, stirring occasionally. Remove from fire, pour into small molds rinsed with cold water, and set aside to cool. Serve cold with whipped cream and fresh fruit.

Chocolate Cream Tapioca

To one quart of scalded milk add one-half cupful of granulated tapioca and boil for ten minutes, using a double boiler. Beat the yolks of two eggs and mix with one-half cupful of sugar and one-fourth teaspoonful of salt. Add to the tapioca mixture two ounces of chocolate and when melted stir in the egg mixture. Cook for two or three minutes and remove from the fire. Add one teaspoonful of vanilla and stir in the well-beaten whites of two eggs until they are thoroughly mixed. Chill before serving.

Loganberry Tapioca

Soak for several hours one and one-half cupfuls of loganberries in three cupfuls of cold water. Simmer in same water for twenty minutes and drain. Dilute the juice with enough boiling water to make two cupfuls and heat to the boiling point. Add one teaspoonful of lemon juice, one-half cupful of sugar, and four tablespoonfuls of granulated tapioca or one-half cupful of pearl tapioca. Cook until the tapioca is clear and then cool slightly. Stir in the loganberries very carefully, pour into a glass dish and set aside to cool. Serve very cold with milk, cream or whipped cream.

Fruit Tapioca

Stir one-half cupful of granulated tapioca into two and one-half cupfuls of boiling water. Add one teaspoonful of salt and a one-inch stick of cinnamon and cook until clear. Remove from the stove and add carefully one tumbler of currant jelly, one cupful of chopped figs, one-half cupful of chopped raisins and one-fourth cupful of chopped almonds, with sweetening to taste. Cool slightly and serve with cream or a custard sauce.

Pearl tapioca may be substituted for the granulated by allowing double the quantity; for example, one-half cupful of pearl tapioca instead of one-fourth cupful of granulated. Before cooking, however, it should be soaked for several hours in cold water or milk.